Prior Art FX Settlement Process   Fig. 1

Trade Date

- Parties transact a series of transactions in various currency pairs

- Parties send confirmations of each trade MT300

- Parties match MT300s to create a confirmed trade

- Parties instruct payment of sold currency leg for each trade

- Parties pre-advice receipt of bought currency leg for each trade

Settlement Date

- Branch or nostro constructs payment queue

- Branch or nostro releases payments as liquidity in local payment system allows

- Branch or nostro sends MT900 to confirm payments

- Branch or nostro sends MT910 to confirm receipts

- Branch or nostro sends MT950 daily statement of account activity

Reconciliation Date

- MT950s from all branches and nostros reconciled to match payment and counterpayment (receipt) settlement of transactions

- Exception report of failed settlements generated

- Failed settlements queried with counterparties

- Decisions on default/payment suspension taken after investigation

- Payments at branches and nostros cancelled on a "best efforts" basis

Fig. 2

Risk

PAYMENT RISK = The risk of loss should an expected payment not be received in a timely manner

CROSS–BORDER SETTLEMENT RISK = The Payment Risk arising in settlement of foreign exchange trades where payment must be made in one currency in expectation of counterpayment being received in another currency

LIQUIDITY RISK = The direct and contingent costs or penalty associated with unanticipated receipt shortfalls

SYSTEMIC RISK = Risk associated with the general health or structure of the financial system as a result of inability to cope with a financial default or liquidity shock

Fig. 3

GPM Network Overview

USD Fedwire
USD CHIPS
EUR Target
EUR EBA
JPY BOJ-NET
JPY FEYSS
CHF SIC
CAD LVTS
GBP CHAPS

Domestic Payment
Systems 5

Payment Bank
Host 3
Applications

Routers
6.3

Routers 6.3

GPM/VPN

6.1

6.3 Router

GPM Core
System

2

Reuters

ATT

S.W.I.F.T. IP
Network

Internet

Various
Internet
Protocol
Networks

6.2

4 User 1
Worksations
and Host
Applications
Worldwide

3rd Parties
Host Apps.

Fig. 4

GPM System

Payment Banks Worldwide

6.3

Payment Bank Host Applications — 3

GPM/VPN

Router — 6.3

6.1

Router — 6.3

IP Networks — 6.2

Router — 6.3

User Worksations and Host Applications Worldwide — 1

Web Server — 2.5

Process Server — 2.4

Security & Authentication Server — 2.3

Databas e Server — 2.2

2.6

Operations Workstation — 2.1

Ethernet

Bridge

Ethernet

GPM Core System 2

Backup Web Server — 2.10

Backup/Mirrored Database Server — 2.8

Backup Process & Auth. Server — 2.9

Backup Ops Workstation — 2.7

2.11

2.12

Fig. 5

GPM Access Security

Certificate Issuance

GPM Core

GPM Certificate Authority

GPM Registration Authority

Certificate Management System

Directory

User/Payment Bank

Host Application requestsGPM account
Passes to GPM Certificate Authority
Requests Certificate
Fills out form
Creates Key Pair
Submits Form and Public Key to Registration Authority
Registration Authority Approves/Rejects Application
Digital Certificate Generated
User Entered in Directory
Digital Certificate Delivered to Host Application

Certificate Usage

GPM Security Application

Certificate Validation Program

Application

Directory

Certification Interface

UserID/PW Validation

User/Payment Bank

Host Application requests GPM session
Passes to GPM security application
Presents Signed Certificate
Validation Program Validates Certificate
Validation Program Validates Privileges

Fig. 6

GPM FX Settlement Process

Trade Date

- Parties transact a series of transactions in various currency pairs

- Parties send confirmations of each trade MT300

- Parties match MT300s to create a confirmed trade

- Parties instruct payment of sold currency leg for each trade to Payment Bank

- Parties pre–advice receipt of bought currency leg for each trade

- Parties advise GPM Payment Banks of Risk Parameters

Settlement Date

- Payment Bank constructs payment queue

- Payment Bank Host Application releases payments through GPM Filter Process

- Payment Bank sends MT900 to confirm payments and MT910 to confirm receipts

- Payment Bank Host App. notifies sustained imbalance as observed

- Exception queries, Suspend Process and liquidity management decisions taken intraday

- Payment Bank sends MT950 daily statement of account activity

Reconciliation Date

- MT950s from all branches and nostros reconciled to determine settlement of transactions
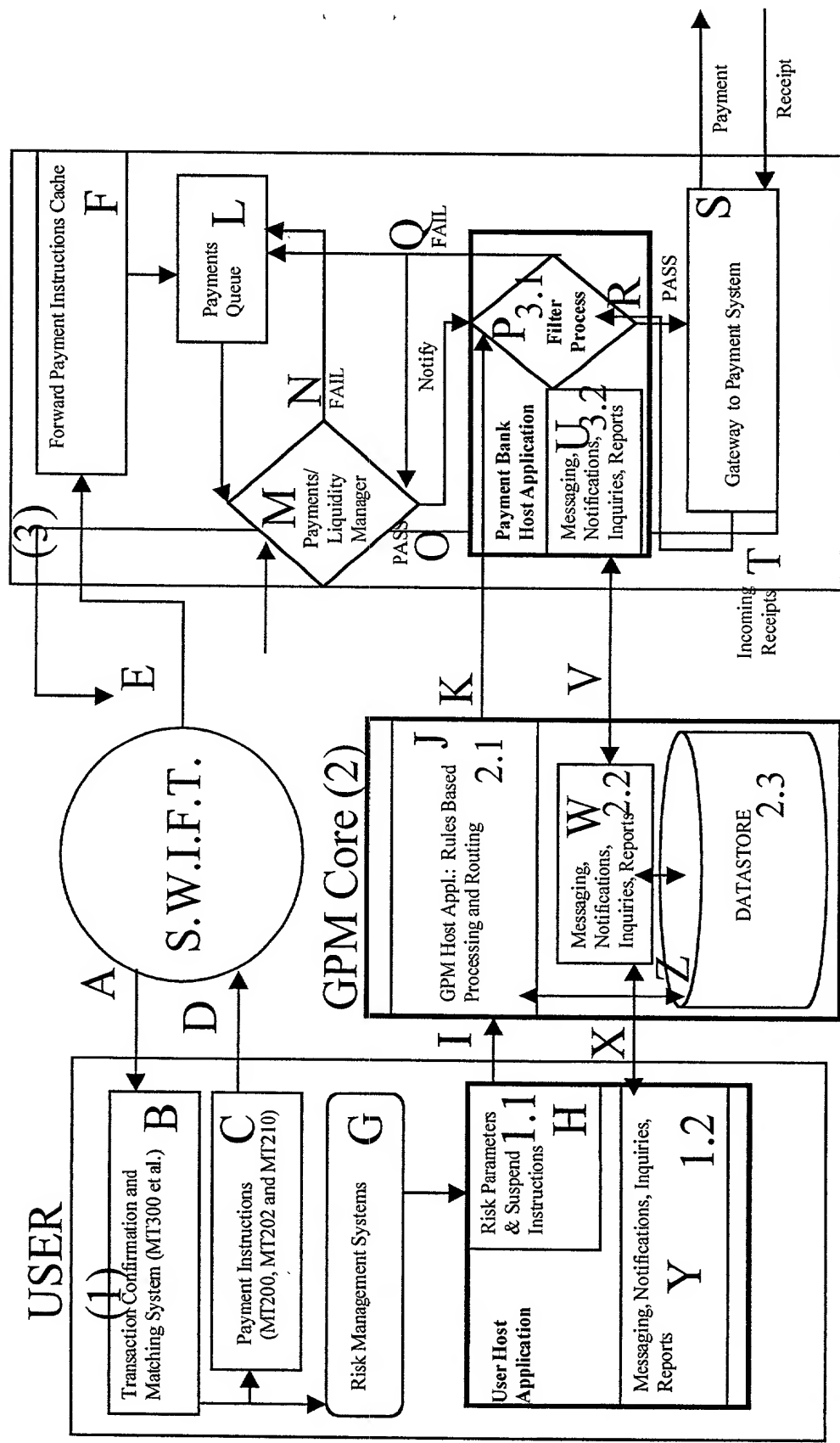
- Follow–up on individual failed settlements / defaults

Fig. 7

GPM Flow Diagram

USER

Transaction Confirmation and Matching System (MT300 et al.) **B**

(1)

Payment Instructions (MT200, MT202 and MT210) **C**

Risk Management Systems **G**

User Host Application

Risk Parameters & Suspend Instructions **H** 1.1

Messaging, Notifications, Inquiries, Reports **Y** 1.2

S.W.I.F.T.

A

D

E

GPM Core (2)

J **K**

GPM Host Appl.: Rules Based Processing and Routing 2.1

I

Messaging, Notifications, Inquiries, Reports **W** 2.2

X

DATASTORE 2.3

Z

V

PAYMENT BANK

Forward Payment Instructions Cache **F**

Payments Queue **L**

(3)

M Payments/ Liquidity Manager

N FAIL

PASS **O**

Notify

P 3.1 Filter Process

Q FAIL

R PASS

Payment Bank Host Application

Messaging, Notifications, Inquiries, Reports **U** 3.2

Gateway to Payment System **S**

T

Incoming Receipts

Payment

Receipt

Fig. 8

GPM in Action

Counterparty A

Counterparty B

Trades

£/$

£/$
1
2
3
4

$/£

$/£
5
6
7
8

MT200

MT200
1
2
3
4

MT200

MT200
5
6
7
8

MT200

MT200
1
2
3
4

MT200

MT200
5
6
7
8

5

1,2

3

4

6,7

8

1

5,6

7

8

2,3

4

Fig. 9A1

Risk Parameter
Instruction Process

(A)
GENERATE
& SEND

```
3rd Party
Host
Application
(4)

Generates Risk
Parameters
```

(B) *GENERATE*
& SEND
&/or RELAY

```
User Host
Application
(1)

Generates/Relays
Risk Parameters
```

(C) *SORT/STORE*
& RELAY

```
GPM
Core
System
(2)

Sorts/Stores/Relays
Risk Parameters
```

(D) *STORE &*
APPLY

```
Payment
Bank Host
Application
(3)

Applies Risk
Parameters
in Filter Process
```

```
Domestic
Payment
System
(5)

Makes
Payment
```

(E) *PAYMENT*

Fig. 9A2

Risk Parameter Instruction Fields

Status	Tag	Field Name	Content/Options	No
M	52a	USER	4a2a2b[3b]	1
O	50	THIRD PARTY (Ordering Customer)	4a2a2b[3b]	2
M	53a	PAYMENT BANK (Sender's Correspondent)	4a2a2b[3b]	3
---->				
M	59 56A/57A	COUNTERPARTY (Beneficiary Customer or Payment Intermediary)	4a2a2b[3b] <BIC>	4
----|				
M	32A	CLEAN PAYMENT LIMIT [Value Date] Currency Code Amount	[6n] 3a 15d	5
---->				
O	<XX>	PAYMENT TYPE	<2a3n[4a]>	6
----|				

USER
Definition: The Unique Identifier (UID) of the User institution initiating the instruction on behalf of itself or a Third Party. **Format:** 4a2a2b[3b]

THIRD PARTY
Definition: The UID of the Third Party initiating the instruction to the User. **Format:** 4a2a2b[3b]

PAYMENT BANK
Definition: The BIC code of the Payment Bank **Format:** 4a2a2b[3b]

COUNTERPARTY
Definition: The UID of the Payment Beneficiary or BIC of a Payment Intermediary **Format:** 4a2a2b[3b]
Multiple instances of this field are permitted.

CLEAN PAYMENT LIMIT
Definition: [Value date] (optional), currency code and amount of Clean Payment Limit.
Format:
    [6n] date (YYMMDD)
    3a currency code
    15d amount

PAYMENT TYPE
Definition: Descriptor(s) of Payment Types for Filter Process **Format:** 2a3n[4a] (e.g., proprietary or customer, minimum payment amount, payment channel)
Where this optional field is left blank, the GPM Filter Process will apply to all payments made on behalf of a referenced User[3] Party to a referenced Counterparty. Multiple instances of this field are permitted.
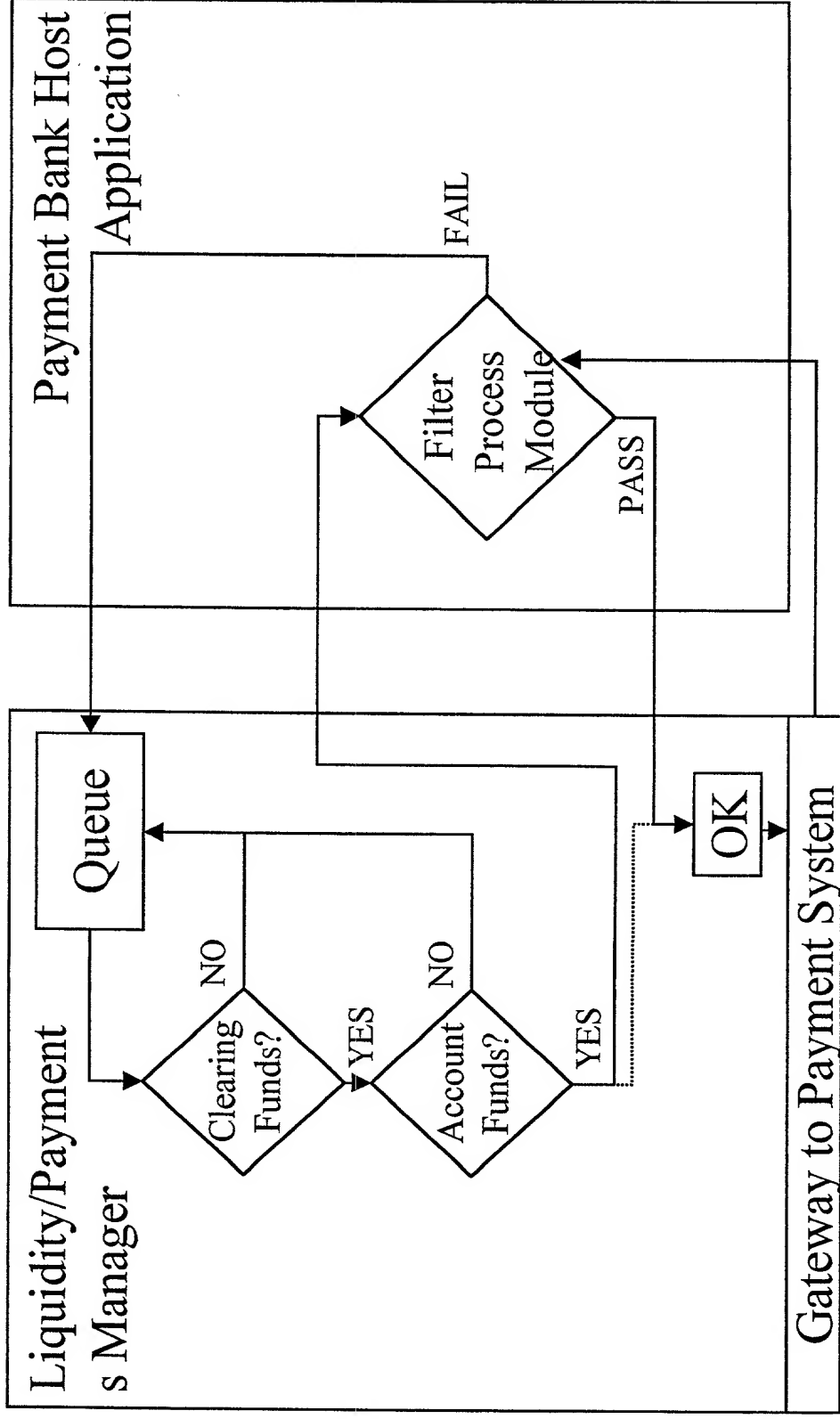
Fig. 9B

Risk Parameters

COUNTERPARTY: A defined entity (or aggregation of entities) described on a payment transaction as either the payment beneficiary or a payment intermediary through reference to industry standard identifiers used in payments messaging.

CLEAN PAYMENT LIMIT: Value threshold on payments from a User/3rd Party as "Payor" in respect of a designated Counterparty. This parameter acts as a debit cap on payments vis-à-vis the designated Counterparty.

PAYMENT TYPE: Given payment type descriptors, allows selection of payment types for subjecting to the Filter Process.

Fig. 9C

PAYMENT BANK APPLICATION INTEGRATION

Payment Bank Host Application

Filter Process Module

FAIL

PASS

Liquidity/Payments Manager

Queue

Clearing Funds?

NO

YES

Account Funds?
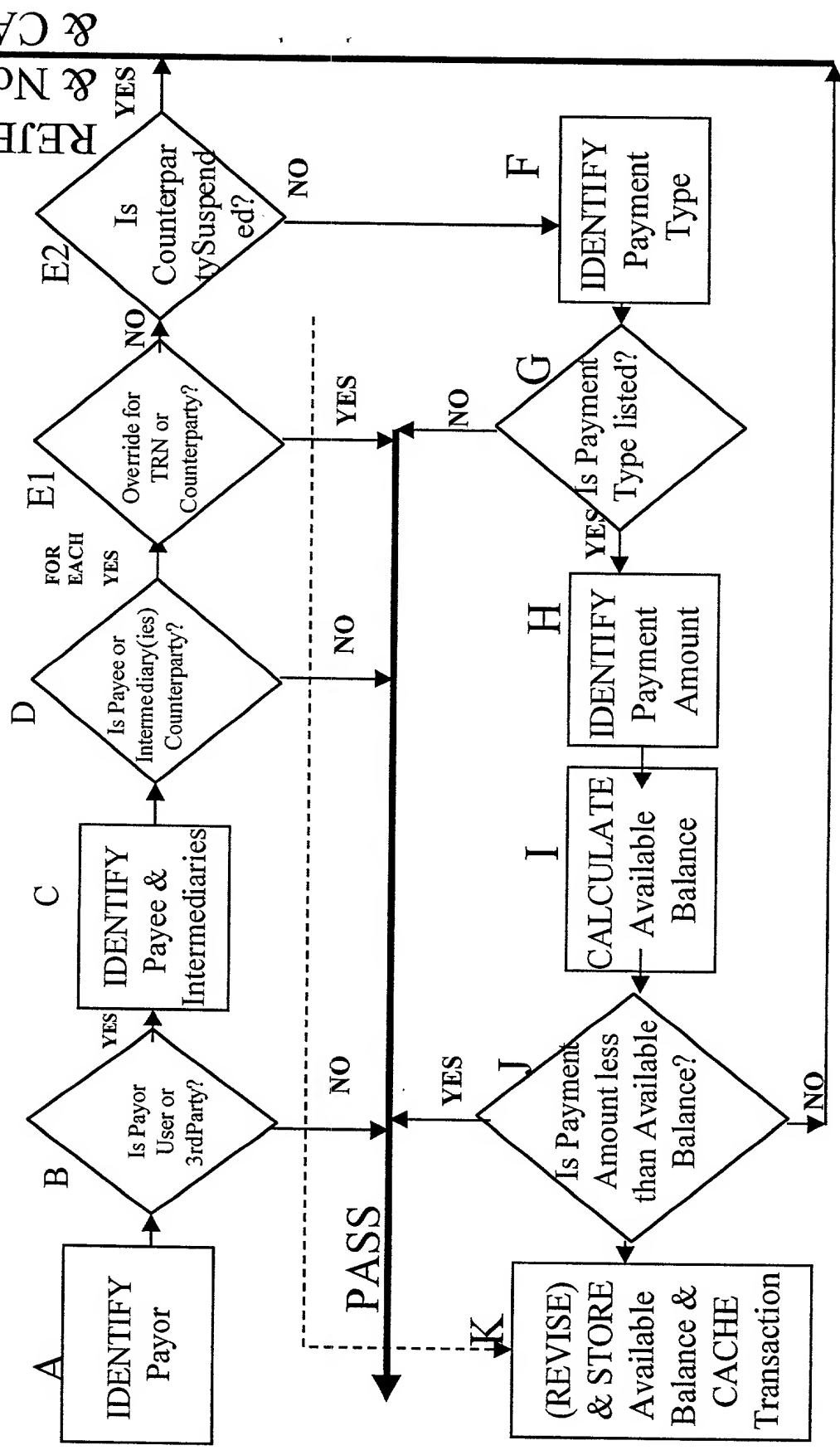
NO

YES

OK

Gateway to Payment System

Fig. 9D1

GPM Filter Process

Step A: Identify Payor

Step B: Assess whether Payor is GPM User/3rd Party

    If NO then PASS payment instruction; If YES then

Step C: Identify Payee and/or Intermediaries

Step D: Identify whether each Payee/Intermediary is a GPM Counterparty of the User/3rd Party

    If NO then PASS payment instruction; If YES then

FOR EACH COUNTERPARTY

Step E1: Check whether Override instructions for Counterparty/Transaction Reference Number

    If YES then PASS payment + reduce Available Balance & store record of transaction;

    If NO then

Step E2: Check whether Counterparty has been Suspended

    If YES then FAIL payment instruction + NOTIFY & store a temporary record of the transaction;

    If NO then

Step F: Identify Payment Type

Step G: Assess whether Payment Type is selected for GPM Filter Process

    If NO then PASS payment instruction; If YES then

Step H: Identify Payment Amount

Step I: Calculate Available Balance

Step J: Assess payment amount against Available Balance

If payment amount is less than Available Balance then PASS payment instruction; If payment amount is more than Available Balance
then FAIL payment instruction + NOTIFY & store a temporary record of the transaction;

Step K: Reduce Available Balance for Counterparty by Payment Amount & store a temporary record of the transaction

The Filter Process will serially assess multiple Counterparties where both intermediaries and ultimate payment beneficiary are
Counterparties.

Fig. 9D2

GPM Filter Process

A IDENTIFY Payor

B Is Payor User or 3rdParty? — YES →

C IDENTIFY Payee & Intermediaries

D Is Payee or Intermediary(ies) Counterparty? — FOR EACH YES →

E1 Override for TRN or Counterparty? — NO →

E2 Is CounterpartySuspended? — YES → REJECT & Notify & CACHE / NO →

F IDENTIFY Payment Type

G Is Payment Type listed? — NO → / YES ↓

H IDENTIFY Payment Amount

I CALCULATE Available Balance

J Is Payment Amount less than Available Balance? — YES → / NO →

K (REVISE) & STORE Available Balance & CACHE Transaction

PASS

E1 → YES →
D → NO →
B → NO →

Step I: Calculating Available Balance

Step I.1: Identify User/3rd Party

Step I.2: Identify Counterparty

Step I.3: Identify last stored Available Balance

3a: Available Balance will be Clean Payment Limit for initial processing

3b: Available Balance last stored by Process Filter

3c: Where Clean Payment Limit is amended intraday, the difference between the new CPL and the old CPL will be added to the stored Available Balance to either increase or decrease the Available Balance accordingly

Step I.4: Generate Inquiry to bank payment/account systems OR take data stream from incoming payments messages specifying Counterparty as a "Payor" or payment intermediary and specifying User/3rd Party as payment recipient since last timestamp

Step I.5: IF payments received, THEN total all payment amounts specified in all received payments

Step I.6: Add all received amounts to the last calculated Available Balance

Step I.7: Store & publish (revised) Available Balance to Filter Process
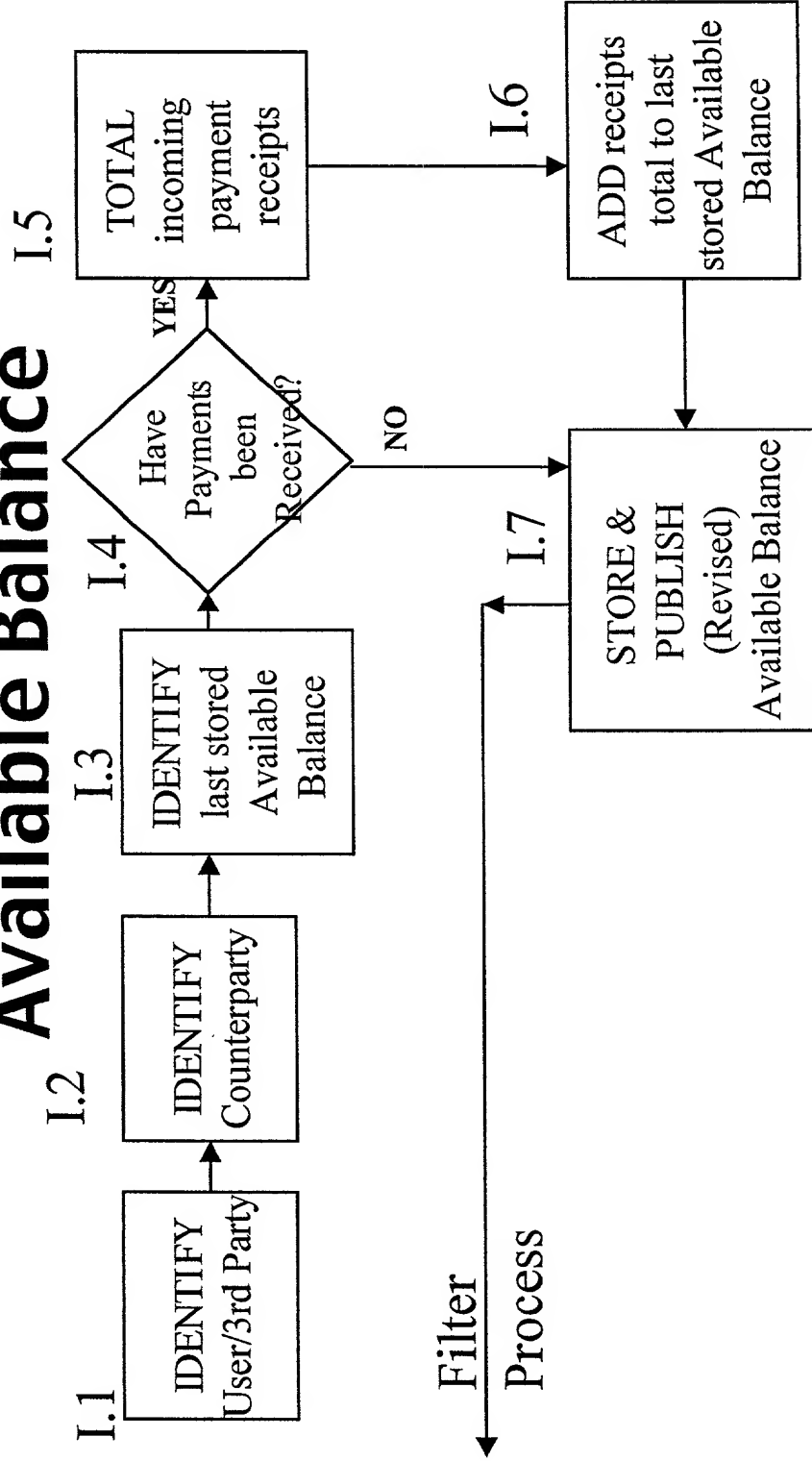
Fig. 9E2

Step I: Calculating Available Balance

I.1 — IDENTIFY User/3rd Party

I.2 — IDENTIFY Counterparty

I.3 — IDENTIFY last stored Available Balance

I.4 — Have Payments been Received?

YES → I.5 — TOTAL incoming payment receipts

I.6 — ADD receipts total to last stored Available Balance

NO → I.7 — STORE & PUBLISH (Revised) Available Balance

Filter Process

Fig. 9F1

GPM Suspend Process
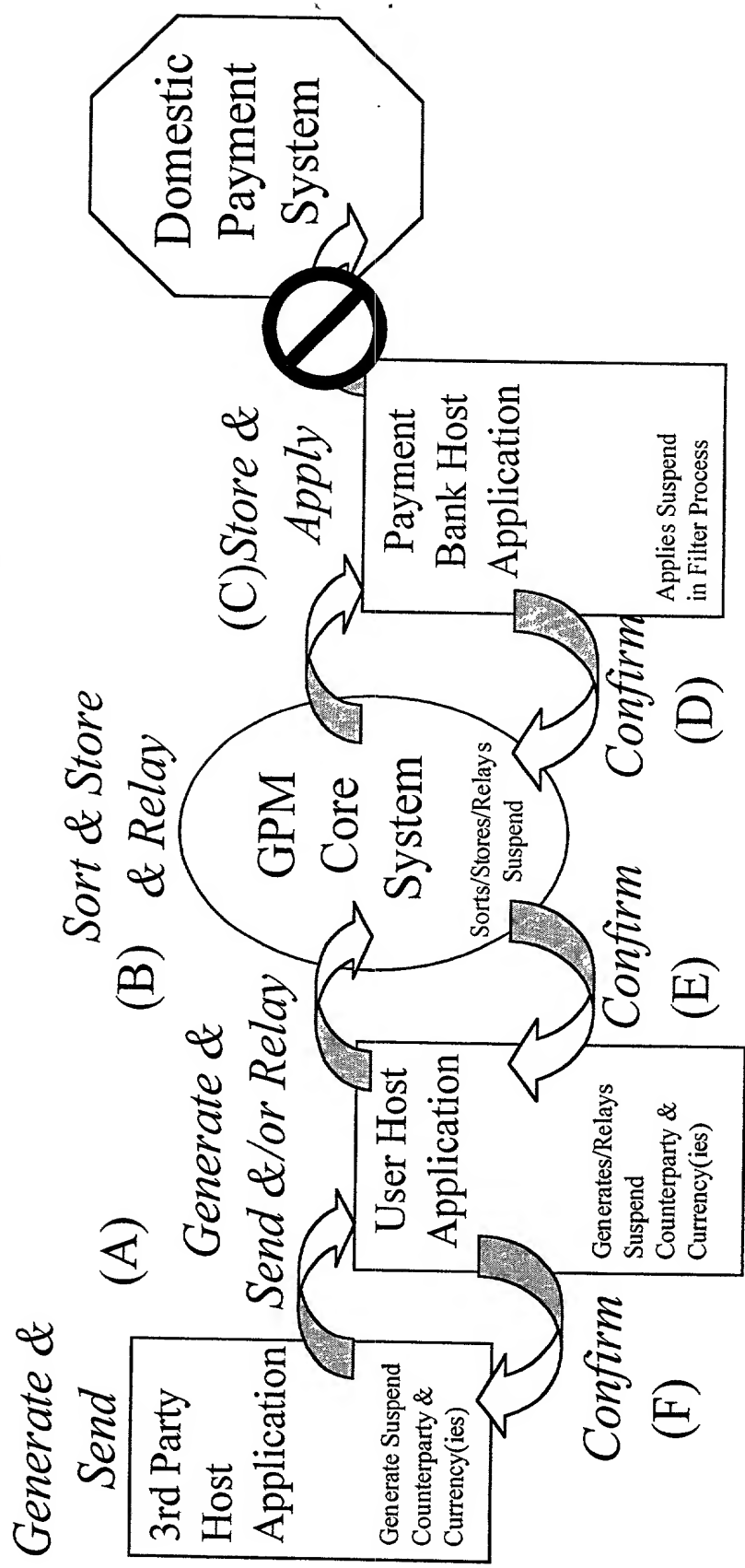
Generate &
Send

(A)

Generate &
Send &/or Relay

3rd Party
Host
Application

Generate Suspend
Counterparty &
Currency(ies)

Sort & Store
& Relay

(B)

User Host
Application

Generates/Relays
Suspend
Counterparty &
Currency(ies)

Confirm

(F)

GPM
Core
System

Sorts/Stores/Relays
Suspend

Confirm

(E)

(C)Store &
Apply

Payment
Bank Host
Application

Applies Suspend
in Filter Process

Confirm

(D)

Domestic
Payment
System

Fig. 9F2

Suspend Instruction Fields

Status	Tag	Field Name	Content/Options	No
M	52a	USER	4a2a2b[3b]	1
O	50	THIRD PARTY (Ordering Customer)	4a2a2b[3b]	2
M	53a	PAYMENT BANK (Sender's Correspondent)	4a2a2b[3b]	3
---->				
M	59 56A/57A	COUNTERPARTY (Beneficiary or Intermediary)	4a2a2b[3b] <BIC>	4
----|				
M	<XX>	SUSPEND INSTRUCTION	7a	5

USER
Definition: The Unique Identifier (UID) of the User institution initiating the instruction on behalf of itself or a Third Party.
Format: 4a2a2b[3b]

THIRD PARTY
Definition: The UID of the Third Party initiating the instruction to the User.
Format: 4a2a2b[3b]

PAYMENT BANK
Definition: The BIC code of the Payment Bank
Format: 4a2a2b[3b]

COUNTERPARTY
Definition: The UID of the Counterparty/Payee on outgoing payments instructions.
Format: 4a2a2b[3b]
The message structure allows for multipleCounterparties to be listed, as many Users and Third Parties will want to aggregate affiliated market trading entities as a single, "synthetic counterparty" for payments risk management purposes.

SUSPEND INSTRUCTION
Definition: Suspends payments in Filter Process
Format: 7a (e.g., "suspend")

Fig. 9F3

GPM Suspend Process

3rd PARTY/USER HOST APPLICATION

Step A.1: Select Counterparty

Step A.2: Select Currency(ies)

Step A.3: Select Suspend Instruction

Step A.4: Generate Suspend Instruction

Step A.5: Confirm Suspend Instruction

GPM CORE SYSTEM APPLICATION

Step B.1: Receive Suspend Instruction

Step B.2: Identify Payment Bank(s) for selected Currency(ies)

Step B.3: Send Suspend Instruction to Payment Bank Host Applications

PAYMENT BANK HOST APPLICATION

Step C.1: Receive Suspend Instruction

Step C.2: Apply SUSPEND in Step 5 of Filter Process

Step D: Confirm Suspend Instruction Implemented

Step E: Confirm Suspend Instruction Implemented

Step F: Receive Confirmation Suspend Instruction Implemented

Fig. 10

GPM Risk Reduction

- Clear limits on Payment Risk and Liquidity Risk
- Effective elimination of Systemic Risk
- No disruption to existing payment mechanisms
- Unilateral choice of Risk Parameters and GPM implementation with counterparty

Legend:
- Gross $ Sold
- Gross £ Sold
- Clean Pay Limit $
- Clean Pay Limit £